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Standardization of blended beverage prepared from Aonla (*Emblica officinalis* Gaertn) fruits

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Abstract

Present investigation consisted of total 13 treatments, replicated thrice and laid out in completely randomized design (CRD). Ready-to-serve (RTS) drink was prepared from Aonla juice by blending it with other fruits like kinnow, pineapple, lime and ginger. Stored RTS beverage was evaluated for sensory and bio-chemical characteristics at every 30th day interval up to 150th day of storage. Out of 13 treatments, T₈ - Aonla: Pineapple: Ginger (50:48:2) was found best in terms of Organoleptic and sensory characteristics (colour, taste, flavour and overall acceptability) and recorded maximum total soluble solids, Treatment T₁- Aonla Juice (100%) recorded maximum ascorbic acid content followed by T₁₀ - Aonla: Lime (75:25). However, best colour was observed in T₃- Aonla: Kinnow (50:50). Total soluble solids was found to increase with progression of storage period. However, ascorbic acid followed declining trend with increasing storage period.

Keywords: Blended, beverage, organoleptic evaluation, RTS

Introduction

Aonla (*Emblica officinalis* Gaertn) popularly known as Indian Gooseberry belongs to family Euphorbiaceae is an indigenous fruit tree mainly cultivated in subtropical, arid and semi-arid regions of the world. Aonla is hardy, drought tolerant, highly remunerative crop, small to medium stature (8 to 18 m in height) deciduous fruit tree with sparse foliage which bears on determinate and indeterminate shoots. Aonla fruits are well known for medicinal and therapeutic effects, highly nutritious and claimed to be 2nd richest source of Vitamin C after Barbados cherry (Kore *et al.*, 2013) [14]. Fruit contains vitamin 'C' (600 mg/100 g) and appreciable amount of sugar (7.53 mg/100 g), minerals like Calcium (14.91 mg/100 g) and Phosphorus (11.81 mg/100 g) (Khan, 2009). Fruit is utilized as one of major ingredients in preparation of several Ayurvedic medicines like Triphala, Chavanprash, Amlaki etc. Blended RTS of Aonla with kinnow, lime, pineapple and ginger for the production of new products is necessary for several health benefits. Blending of two or more fruit juices for the preparation of ready-to-serve beverage appears to be convenient and economical alternative for utilization of Aonla as well as consumer. The technology required for making the fruit juice/ beverages making is simple. Various workers like Dhaliwal and Hira (2001) [15], Bidyut *et al.* (2002) [4], Bhardwaj and Mukerjee (2011) [16] and Devra *et al.*, 2017 [6] reported that two or more fruit juices/pulp may be blended in various proportions for the preparation RTS beverage

Material and Methods

Freshly harvested Aonla and Kinnow fruits of uniform size at mature stage were obtained from orchard of ICAR-CIAH, Bikaner and brought to the Post harvest laboratory of the Department of Horticulture, College of Agriculture, and Bikaner. Fruits were inspected for any kind of damage and spoilage. The immature, over mature, spotted and off-type fruits were discarded. The selected fruits were thoroughly washed with tap water to remove dirt and dust particles adhering to surface of fruits and then allowed to dry. Pineapple, lime, rhizome of ginger were obtained from local market. Before treatment, pineapple, lime and ginger rhizome were washed with water to remove dirt and impurities adhered to it and dried at room temperature. The overall acceptability of the product with respect to colour, flavour and taste were evaluated by a panel of six judges by using Hedonic Rating scale out of 9 marks. Total soluble solids (TSS) was recorded by placing drop of juice and recording the reading using digital hand refract meter (0-50°Brix). The ascorbic acid was estimated by methods suggested by (AOAC, 2007) [1].

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Result and Discussion

Overall acceptability of stored Aonla Blended RTS Beverage

Perusal of data in Table 1 showed the effect of different recipe treatments on overall acceptability of blended RTS beverage. It was observed that score for the overall acceptability of blended RTS decreases with advancement of storage period in all the treatments. On 30th day of storage, maximum score (8.83) for overall acceptability was recorded in T₈- Aonla: Pineapple: Ginger (50:48:2) followed by T₄- Aonla:Kinnow:Ginger (50:48:2) and minimum score (6.34) was recorded in T₁₁- Aonla: Lime (50:50) On 150th day, maximum score (6.45) for overall acceptability was found that T₈- Aonla: Pineapple: Ginger (50:48:2) which was at par with T₄- Aonla: Kinnow: Ginger (50:48:2). However, minimum score (4.47) was recorded in T₁₁- Aonla: Lime (50:50) on 150th day of storage. Panda *et al.* (2019) [9] reported that the score for overall acceptability of Jamun RTS was affected by different treatments recorded at 0, 30, 60 and 90 days of storage. The trend of decrease overall acceptability during storage period have been reported in RTS prepared from Aonla-carrot (Desai *et al.*, 2016) [5], guava Aonla RTS (Mall and Tondan 2007) [7], mango beverage (Ramdevputra *et al.*, 2009) [11], pineapple RTS (Mansoor *et al.*, 2017) [8], guava (Abhangrao *et al.*, 2017 [2]; Pandey, 2004) [10].

Total soluble solids (°B) of stored Aonla Blended RTS Beverage

The data on total soluble solids (°B) of blended Aonla RTS beverage as affected by recipe treatments during storage period were presented in Table 2. Total soluble solids of stored RTS beverage increased with advancement of storage period in all the treatments. TSS was found non-significant on 0th, 30th and 60th day of storage. All the treatments were standardized at 10.00 °B on the initial day (0th day) of storage. On 30th day of storage, maximum TSS (10.50 °B) was observed in T-8 Aonla: Pineapple: Ginger (50:48:2)

which was found at par with T₄- Aonla: Kinnow: Ginger (50:48:2) and minimum score (10.00°B) was recorded in T₁₁- Aonla: Lime (50:50) which was found at par with T₁₀. Similarly, on 150th day of storage the maximum TSS (13.68°B) was observed in T₈-Aonla: Pineapple: Ginger (50:48:2) which was at par with T₄- Aonla: Kinnow: Ginger (50:48:2) whereas minimum TSS (12.69 °B) was recorded in T₁₁ i.e. Aonla: Lime (50:50). The increase in total soluble solids of Aonla based blended RTS beverages during storage might be due to hydrolysis of polysaccharides, starch and pectin substances into monosaccharide's (sugars) and due to dehydration (Devra *et al.*, 2017) [6].

Ascorbic acid (mg/100 ml) of stored Aonla Blended RTS Beverage

Data in Table 3 revealed total ascorbic acid in blended Aonla RTS beverage during storage. Observations were recorded from 30th to 150th day of storage showed that ascorbic acid decreased with increase in storage period in all the treatments. Different recipe treatments had significant effect on ascorbic acid content of Aonla RTS beverage during the entire period of storage period. On 30th day of storage, maximum ascorbic acid content (91.38 mg/100 ml) was observed in T₁- Aonla Juice (100%) followed by T₁₀- Aonla: Lime (75:25) i.e. (89.85 mg/100 ml) and recorded minimum (45.60 mg/100 ml) in T₈- Aonla: Pineapple: Ginger (50:48:2). Similarly, on 150th day of storage, maximum ascorbic acid (76.21 mg/100 ml) was recorded in T₁- Aonla (100%) followed by T₁₀- Aonla: Lime (75:25) i.e. (69.95 mg/100 ml) and recorded minimum (28.19 mg/100 ml) in T₈- Aonla: Pineapple: Ginger (50:48:2). Sarkar and Bulu (2017) [13] reported that possible cause of decrease in ascorbic acid during storage. Ascorbic acid was found highly sensitive to oxidation, being sensitive to oxygen, light and heat, it could be easily oxidized in presence of oxygen by both enzymatic and non-enzymatic catalyst and subsequently suffer loss or decline during storage.

Table 1: Effect of recipe treatments on Overall acceptability of blended Aonla RTS beverage during storage

Symbols	Treatments	Overall Acceptability					
		Storage period (days)					
		0	30	60	90	120	150
T ₁	Aonla Juice (100%)	7.76	7.10	6.62	6.44	5.88	5.73
T ₂	Aonla: Kinnow (75:25)	8.27	7.54	7.31	7.11	6.45	5.59
T ₃	Aonla: Kinnow (50:50)	8.67	8.45	8.25	7.92	7.48	6.24
T ₄	Aonla: Kinnow: Ginger (50:48:2)	8.84	8.74	8.56	8.40	7.68	6.39
T ₅	Aonla: Kinnow: Ginger (75:23:2)	8.45	8.19	7.64	7.42	7.17	6.00
T ₆	Aonla: Pineapple (75:25)	8.33	7.75	7.45	7.33	6.78	5.96
T ₇	Aonla: Pineapple (50:50)	8.77	8.62	8.44	8.26	7.56	6.33
T ₈	Aonla: Pineapple: Ginger (50:48:2)	8.87	8.83	8.68	8.48	7.78	6.45
T ₉	Aonla: Pineapple: Ginger (75:23:2)	8.53	8.24	7.95	7.66	7.53	5.93
T ₁₀	Aonla: Lime (75:25)	7.63	6.58	6.32	6.16	5.78	5.42
T ₁₁	Aonla: Lime (50:50)	7.50	6.34	5.61	5.28	4.85	4.47
T ₁₂	Aonla: Lime: Ginger (50:48:2)	8.16	7.35	7.02	6.74	6.72	5.87
T ₁₃	Aonla: Lime: Ginger (75:23:2)	7.84	7.16	6.80	6.64	6.48	5.95
	S.Em ±	0.05	0.04	0.06	0.07	0.05	0.09
	C.D. (p = 0.01%)	0.14	0.13	0.17	0.22	0.25	0.27

Table 2: Effect of recipe treatments on total soluble solids ($^{\circ}\text{B}$) of blended Aonla RTS beverage during storage

Symbols	Treatments	Total soluble-solids ($^{\circ}\text{B}$)					
		Storage period (days)					
		0	30	60	90	120	150
T ₁	Aonla Juice (100%)	10.00	10.05	10.71	11.84	12.46	12.79
T ₂	Aonla: Kinnow (75:25)	10.00	10.26	10.97	12.33	13.05	13.32
T ₃	Aonla: Kinnow (50:50)	10.00	10.34	11.08	12.42	13.12	13.49
T ₄	Aonla: Kinnow: Ginger (50:48:2)	10.00	10.44	11.19	12.50	13.19	13.65
T ₅	Aonla: Kinnow: Ginger (75:23:2)	10.00	10.17	10.87	12.28	12.88	13.16
T ₆	Aonla: Pineapple (75:25)	10.00	10.31	11.03	12.38	13.09	13.38
T ₇	Aonla: Pineapple (50:50)	10.00	10.38	11.13	12.46	13.15	13.54
T ₈	Aonla: Pineapple: Ginger (50:48:2)	10.00	10.50	11.23	12.53	13.21	13.68
T ₉	Aonla: Pineapple: Ginger (75:23:2)	10.00	10.21	10.91	12.30	12.90	13.22
T ₁₀	Aonla: Lime (75:25)	10.00	10.02	10.67	11.78	12.38	12.81
T ₁₁	Aonla: Lime (50:50)	10.00	10.00	10.64	11.71	12.29	12.69
T ₁₂	Aonla: Lime: Ginger (50:48:2)	10.00	10.08	10.74	11.90	12.55	13.03
T ₁₃	Aonla: Lime: Ginger (75:23:2)	10.00	10.13	10.81	11.99	12.59	13.05
S.Em \pm		0.24	0.33	0.30	0.15	0.08	0.07
C.D. ($p = 0.01\%$)		NS	NS	NS	0.45	0.24	0.22

Table 3: Effect of recipe treatments on ascorbic acid (mg/100ml) of blended Aonla RTS beverage during storage

Symbols	Treatments	Ascorbic acid (mg/100ml)					
		Storage Period (days)					
		0	30	60	90	120	150
T ₁	Aonla Juice (100%)	93.92	91.38	88.00	84.90	80.83	76.21
T ₂	Aonla: Kinnow (75:25)	69.58	67.19	63.33	59.90	57.41	51.18
T ₃	Aonla: Kinnow (50:50)	66.89	62.85	55.91	53.10	48.99	44.12
T ₄	Aonla: Kinnow: Ginger (50:48:2)	62.22	57.69	51.58	48.55	43.80	40.25
T ₅	Aonla: Kinnow: Ginger (75:23:2)	68.10	64.66	62.36	57.83	52.22	45.86
T ₆	Aonla: Pineapple (75:25)	60.58	56.66	53.16	48.40	42.95	39.04
T ₇	Aonla: Pineapple (50:50)	54.50	50.16	46.79	44.89	41.19	31.19
T ₈	Aonla: Pineapple: Ginger (50:48:2)	52.08	45.60	43.22	40.09	37.10	28.19
T ₉	Aonla: Pineapple: Ginger (75:23:2)	57.51	53.28	49.87	46.77	42.16	36.79
T ₁₀	Aonla: Lime (75:25)	91.03	89.85	86.43	83.31	76.30	69.95
T ₁₁	Aonla: Lime (50:50)	78.90	76.15	75.04	71.08	66.87	62.65
T ₁₂	Aonla: Lime: Ginger (50:48:2)	77.25	72.46	70.08	63.52	60.20	55.26
T ₁₃	Aonla: Lime: Ginger (75:23:2)	89.51	87.18	84.53	80.06	73.68	66.05
S.Em \pm		1.24	1.31	1.13	1.01	1.19	1.62
C.D. ($p = 0.01\%$)		3.61	3.82	3.07	2.96	3.46	4.72

Conclusion

On the basis of results obtained in the present investigation, it can be concluded that among different recipe treatments, T₈-Aonla: Pineapple: Ginger (50:48:2) followed by T₄-Aonla: Kinnow: Ginger (50:48:2) were found best on the basis organoleptic quality and sensory attributes and recorded maximum TSS, Maximum ascorbic acid was recorded in T₁-Aonla 100% (Control) followed by T₁₀-Aonla: Lime (75:25).

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